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ECOLOGICAL LANDSCAPE AND ENDEMIC DISEASES OF THE KERINCI COMMUNITY BEFORE THE CONSTRUCTION OF THE KERINCI HIGHWAY 1903-1915

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ABSTRACT

Before the construction of the Kerinci highway (Korintjiweg) from 1903 to 1915, the Kerinci region was in a state of extreme isolation due to the difficulty of accessing and leaving the area. This condition limited the mobility of the residents, economic activities were conducted simply, and the health patterns of the community were greatly influenced by the humid mountainous environment and the distance from health service centers. This research aims to describe the health conditions of the Kerinci community before the existence of the highway by examining the types of diseases that emerged, environmental factors affecting health, and how isolation shaped disease patterns that tended to remain constant over time. This research uses historical methods through source collection, document reliability examination, interpretation, and the compilation of analysis results based on health reports from the Dutch colonial government and administrative records. The research results show that the isolation of Kerinci provided protection from several dangerous diseases commonly found in coastal areas, such as cholera, smallpox, and syphilis. However, the community still faces diseases that arise from daily life, such as skin diseases, respiratory issues, digestive problems, and fatigue due to heavy agricultural work. Some reports also noted the presence of early cases of gonorrhoea and leprosy, indicating limited connections with other regions although it has not yet caused widespread outbreaks. The absence of permanent healthcare facilities and reliance on traditional medicine make the community vulnerable to chronic diseases or more severe infections. Overall, this study shows that the health conditions of the Kerinci community before the construction of the highway were shaped by the isolated nature of the region, the daily lives of the community relying on nature, and the lack of healthcare services, resulting in a stable disease pattern but with clear vulnerabilities.

I. INTRODUCTION

The study of the relationship between ecological landscapes and endemic diseases is one of the important approaches in the history of health and environment, especially in the context of indigenous communities in colonial regions. Before large-scale interventions through the construction of modern infrastructure, such as highways, the patterns of community life were heavily determined by the surrounding natural conditions. In the Kerinci region in the early 20th century, the landscape consisting of mountains, dense forests, swamps, and a system of rivers and lakes formed a complex ecological landscape. This landscape not only influences settlement patterns, mobility, and economic activities of the community but also plays a significant role in shaping the ecology of endemic diseases.¹ Diseases such as beriberi, respiratory tract infections, malaria in lowland areas, skin diseases due to limited sanitation, and digestive disorders arising from poor water quality, have become part of daily reality.

Prior to the start of construction on the Kerinci Highway in 1903, the Kerinci people lived in relative seclusion from colonial administrative centers. This circumstance resulted in a different ecological adaption system, both in terms of natural resource utilization and disease management. The humid environment, abundant rainfall, and reliance on locally produced agricultural products and natural food sources all have an impact on public health patterns. Endemic diseases, which developed in response to environmental conditions and lifestyle habits, were part of daily life, and were frequently comprehended via a framework of indigenous knowledge rather than the medical-biomedical framework established later by the colonial authority (Mardi, 2022).

The period 1903–1915 was a crucial phase marking the transition from a relatively stable ecological landscape to one that began to undergo changes due to colonial penetration through road construction. However, to understand the health impacts and the emergence of disease crises during that period of development, it is important first to trace the ecological conditions and disease patterns before the infrastructure intervention was carried out. By placing the Kerinci community as the main subject, this article aims to examine how the pre-highway ecological landscape shaped endemic diseases, as well as how the balance between humans, the environment, and diseases was intertwined before experiencing structural disruptions due to colonial development.

Studies on the history of health in the Dutch East Indies have developed quite rapidly over the past two decades, particularly through research highlighting the relationships between poverty, environment, urbanisation, and Dutch colonial medical policies. However, historians' attention is still very much focused on coastal and urban areas—places where Dutch colonial interactions were most intensive. On the other hand, the interior regions like Kerinci are often overlooked in the main studies, even though the geographical conditions, lifestyle patterns, and isolation of these

¹ Penyakit yang selalu ada atau sering muncul di suatu wilayah tertentu dalam jangka waktu lama, bukan penyakit yang datang tiba-tiba atau menyebar luas kemana-mana.

areas create health dynamics that are very different from those of the colonial port cities. The author chose this topic because they want to fill the research gap: until now, there has been almost no historical study specifically examining the health conditions of the Kerinci community before the modernisation of Dutch colonial infrastructure in the early 20th century.

A number of new works reflect a growing interest in Indonesian public health history, but their breadth is still limited, both geographically and conceptually. Several journal papers on the history of health, such as Albar's on structural poverty and trachoma in Jombang, show how socioeconomic constraints influence the health vulnerabilities of rural people in East Java (Albar, 2025). Meanwhile, Amalia investigates hygiene initiatives in Javanese cities from 1900 to 1942, demonstrating how the Dutch colonial administration influenced cleaning norms in urban areas through rules, propaganda, and health infrastructure (Amalia, 2024). In Sumatra, research on the spread of epidemics and the anticipatory actions of the Dutch colonial government in Sumatra's Westkust (1873–1939) written by Dedi Arsa emphasises how ports, mobility routes, and administrative control are key to understanding the flow of diseases such as cholera, smallpox, and influenza (Arsa, 2015). Although these works provide important insights into the dynamics of colonial health, they all focus on coastal areas, cities, or regions connected to colonial mobility networks.

Unfortunately, research on public health in the remote areas—especially Kerinci—is almost nonexistent. Most writings about Kerinci actually focus on the Dutch colonial administration, ethnographic geography, and other topics. The historiography of Kerinci generally focuses on political and economic integration, rather than on public health aspects. In the view of the Dutch colonial government, public health was not placed as a welfare objective, but rather as part of political and economic interests. Public health is understood functionally, that is, to the extent that the physical condition of the community supports regional stability, smooth administration, and the availability of labour. Diseases and new epidemics are considered serious problems when they have the potential to disrupt agricultural productivity, forced labour implementation, or infrastructure projects such as road construction. As a result, important aspects such as disease patterns, the relationship between isolation and health, and the limitations of medical services before the construction of Korintjiweg have never been analysed in depth. This gap is the main reason the author chose this topic, while also offering a new perspective in the study of Sumatra's interior during the Dutch colonial period.

The main novelty of this research lies in the ecological landscape history approach in examining endemic diseases in the Kerinci community before the construction of the Kerinci Highway (1903–1915). So far, studies on diseases in the central Sumatra region have generally focused on the period of colonial intervention—particularly during the construction of infrastructure, the implementation of forced labour, and the introduction of colonial health policies—so that the health conditions of the community before the highway project are often

positioned as a static background and not analysed in depth. This research instead places the pre-development phase as the main analytical space, tracing the dynamic relationships between the natural environment, community lifestyles, and disease ecology.

This research also offers novelty by shifting the focus from the normative colonial medical narrative to the ecological and social experiences of local communities. Instead of viewing endemic diseases merely as a result of the "backwardness" or "uncivilised" nature of indigenous communities—as commonly seen in colonial reports—this study shows that diseases develop within a relatively balanced ecological system, where agricultural practices, consumption patterns, limited mobility, and local knowledge play crucial roles in managing health risks. Thus, endemic diseases are not understood as anomalies, but rather as part of a historical adaptation to the natural landscape of Kerinci.

Moreover, the novelty of this research lies in the effort to integrate environmental history and health history within the context of colonial infrastructure. Previous studies tend to separate the study of natural landscapes from discussions of disease, or place highways only as economic and political factors. This article demonstrates that changes in the landscape due to road construction cannot be separated from changes in disease ecology, and that this understanding can only be achieved by first reconstructing the pre-road ecological conditions in detail.

Historically, this research enriches the study of Kerinci by presenting a rarely touched micro perspective, while also filling the gaps in the history of health in the interior regions of Sumatra. By combining colonial archival sources, early medical reports, and critical readings of geographical and environmental descriptions, this research presents a new narrative that challenges colonial deterministic assumptions about the relationship between nature, disease, and indigenous societies. Thus, this article not only offers empirical novelty but also conceptual novelty in understanding endemic diseases as products of historical interactions between ecological landscapes and social structures before large-scale colonial interventions.

II. METHODS

This research employs historical methods that include the stages of heuristics, source criticism, interpretation, and historiography. Primary sources were obtained from ANRI, contemporary newspapers, Dutch colonial reports, such as the colonial report, as well as health reports from the Dutch East Indies government, which provide a direct picture of the environmental conditions, diseases, and the work and mobility situations of the population in Kerinci in the early 20th century. Secondary sources in the form of books and scientific articles on the history of health, colonial infrastructure, and disease dynamics in Indonesia are used to provide a broader analytical framework. However, this research faces significant limitations due to the lack of literature specifically discussing Kerinci, especially in the field of health, so the reconstruction of the health history of this region must rely more heavily on primary sources.

Nevertheless, this research successfully uncovered several important findings, namely that Kerinci before the construction of the highway was in a vulnerable health condition due to geographical isolation; that diseases such as beriberi, digestive disorders, and endemic infections emerged as a result of a combination of environmental factors and limited medical services; and that changes in mobility after the construction of the road also shaped a new epidemiological landscape for the local community.

III. RESULT AND DISCUSSION

The Health Condition of the Kerinci Community Before Korintjiweg

Prior to the construction of the Kerinci-West Sumatra coastline route, the Kerinci region was largely isolated from the rest of the world. In 1903, all communication and mobility in the community were still dependent on steep, narrow, slippery, and arduous trails, particularly during the rainy season. These pathways go through steep mountains, dense forests, quick rivers, and deep valleys, taking days to traverse between villages or to the western coast. These constraints not only impede trade and human movement, but they also produce a socio-ecological structure that permits Kerinci to operate at its own speed, relatively independent of the economic and administrative dynamics of colonial coastal districts. In the midst of these constraints, access to contemporary healthcare services is nearly impossible. Due to a lack of government doctors, medical facilities, and the difficulties in mobilizing pharmaceuticals, the community has had to rely entirely on natural immunity, traditional healing methods, indigenous herbs, and environmental adaptation patterns to cope with seasonal ailments (Hudaya et al., 2023).

In this context, the public health of Kerinci is shaped by a combination of natural factors, including the cold and humid mountain climate and local medical knowledge passed down through generations. Geographical isolation actually creates a kind of "natural protection" that limits the entry of new diseases from outside, but at the same time allows certain endemic diseases to persist for a long time without adequate medical treatment. When the highway construction project was planned and gradually opened up that geographical isolation, the changes that emerged were not only physical and economic but also significantly determined the direction of public health. The opening of transportation routes allowed for the movement of labour, Dutch colonial officials, traders, and technology on a scale that was previously impossible, as well as facilitating the flow of goods such as medicines, vaccines, and medical equipment. However, these changes also brought new consequences, such as increased mobility which also heightened the potential for the spread of diseases from outside the region, while the concentration of large numbers of workers at construction sites created opportunities for the emergence of previously non-dominant diseases (H.C. Zentgraaf et al, 1936).

The condition of geographical isolation and limited access to healthcare services before the construction of the highway is increasingly relevant when linked to the population size and

structure of Kerinci at that time. According to official data from the Dutch colonial government in 1909, the population of Kerinci was recorded at 80,110 people, with a composition that was almost entirely made up of indigenous residents who had settled there for generations. From that total, only 80 Malay immigrants and 10 temporary Chinese residents were present, indicating that the isolation of this region was not only physical but also demographic, with minimal migration flows, limited inter-ethnic interactions, and little exchange of medical knowledge from outside. The adult male population reached 15,647 people, a figure that reflects the structure of an agrarian society that works intensively in the agriculture and people's plantation sectors. Demographic structures like this, with a large local labour force and dependence on rice and field productivity, make public health a crucial factor in the sustainability of household economies and social life (*Geneeskundig Tijdschrift Voor Nederlandsch-Indie Deel XLIX*, 1909).

In the situation, the limitations of healthcare services cannot be separated from the continuously increasing demographic pressure. With more than 80 thousand souls scattered across the valleys of Kerinci and almost no presence of government doctors or colonial health facilities, the community lives in high vulnerability to endemic diseases such as fever, gastrointestinal infections, and nutritional disorders. The previous isolation indeed served as a natural barrier against the arrival of new diseases, but at the same time, it did not provide a protective mechanism if diseases began to spread within the community. Therefore, when the construction of the Kerinci–Padang highway opened large-scale mobility through the arrival of contract workers, logistics carriers, and the intensification of trade flows, demographic and epidemiological changes occurred simultaneously. The flow of people and goods in and out sharply increased, connecting the Kerinci population with coastal areas that have different disease dynamics. In such a context, the large population size and dense settlements in the valley become additional risk factors that accelerate the likelihood of new disease transmission or exacerbate existing diseases (Sumatra-Courant: Nieuws- en advertentieblad, 1880).

In addition to demographic factors and isolation, the geographical and climatic conditions of Kerinci also played an important role in the dynamics of public health before the construction of the highway. Kerinci is known as a highland area with an elevation of about 900 meters above sea level, a geographical characteristic that shapes both the patterns of life and the patterns of diseases in the community. The cooler temperatures compared to the western coastal areas of Sumatra and the relatively low rainfall reported in 1909 created an ecological environment that was not always conducive to the development of certain tropical diseases. This condition makes Kerinci naturally more protected from outbreaks that often affect the hot and humid lowland areas, such as cholera, typhoid fever, acute dysentery, and several types of tropical fevers. At the same time, the cool weather and mountainous topography also shape the rhythm of community life, including farming patterns, mobility intensity, and their methods of combating diseases with

traditional healing techniques that adapt to the local climate (*Geneeskundig Tijdschrift Voor Nederlandsch-Indie Deel XLIX*, 1909).

However, this relatively favourable geographical condition is not entirely free from challenges. Kerinci is an active volcanic region, with seismic activity recorded several times in 1909. Those earthquakes not only affected the condition of people's housing and the stability of agricultural land, but also impacted health aspects, such as through sanitation disruptions, damage to water sources, or the resettlement of housing that could increase vulnerability to infectious diseases. Thus, the ecological balance of Kerinci before the construction of the highway was the result of a complex interaction between the natural protection of the highlands and the vulnerability due to geological activities (Hudaya et al., 2023).

In addition, in 1913, the Kerinci region was reported to be experiencing the emergence of fever symptoms spreading in several villages. This raised concerns among colonial health officials. Although the cause has not yet been determined, the Dutch colonial government immediately took anticipatory measures because the symptoms were feared to be related to cholera, one of the deadly diseases that was rampant in the Dutch East Indies. As a precautionary measure, health authorities sent a medical team to Kerinci to conduct examinations and simultaneously distribute cholera vaccines to the residents (De Telegraaf, 1914).

The Absence of Hospitals and Dependence on Traditional Medicine

When access to Kerinci began to open up and the flow of people from coastal areas increased, the dynamics of public health slowly but significantly changed. The highway brings in workers from various regions, including areas with a higher burden of tropical diseases. This opens up the possibility of pathogens, both bacteria and parasites, entering the highlands of Kerinci, which previously had little or no circulation. Diseases that thrive in coastal areas due to the hot and humid climate now have a new route to enter the interior, expanding the risk of transmission in communities that were previously relatively protected. With the increased contact between populations and the opening of geographical isolation, the disease ecology of Kerinci is also beginning to transform. Environmental factors that were previously natural barriers can no longer fully contain the flow of diseases that follow human mobility (Manson et al, 1905).

The limited access to modern health knowledge is also reflected in the low utilisation of local natural resources for medicinal purposes. In the northern part of the Kerinci Valley, there is a natural hot spring containing sulphur, a geological phenomenon that in modern medical tradition is known to be beneficial for treating skin diseases, rheumatism, and various joint disorders. However, reports from the Dutch colonial government in the early 20th century indicate that the Kerinci community did not utilise the hot springs for medicinal purposes. The minimal utilisation of this resource is not just due to ignorance of its medicinal properties, but also reflects a gap in understanding between the local knowledge system and the modern health approach

introduced by the Dutch colonial government (*Geneeskundig Tijdschrift Voor Nederlandsch-Indie Deel XLIX*, 1909).

In many mountain communities of the Indonesian archipelago, traditional healing practices usually rely on herbal concoctions, customary rituals, or ancestral knowledge that focuses on the balance between the body and the environment. Sulphur hot springs, although part of the daily lives of the community, do not automatically fall into the category of "medicine" within the framework of local knowledge, especially if they do not have a clear ritual or symbolic role. This creates a form of "knowledge disconnection," where the presence of natural resources with high therapeutic potential is not integrated into local public health practices. On the other hand, colonial healthcare workers who recognised the medical value of these resources saw it as an indication of the lack of health education and limited contact of the community with modern medical thinking (Haan, 1903).

One of the most common endemic diseases suffered by the people of Kerinci at that time was scabies. This skin disease is widespread across all layers of society, affecting not only ordinary residents but also traditional leaders and community figures. The high prevalence of scabies shows that the public health issues in Kerinci do not lie in major diseases like cholera or smallpox—which are absent from colonial official reports—but rather in chronic diseases that continue to disrupt daily life. In the local social context, scabies is no longer viewed as a dangerous medical condition, but has become part of a routine that is considered normal and does not require special attention. This perception is a logical extension of low health literacy and minimal exposure to modern health ideas, which was previously illustrated by the community's inability to utilise sulphur hot springs for medicinal purposes (Haan, 1903).

In such circumstances, most new scabies patients will only seek medical help when their skin condition has deteriorated extremely. Even when treatment was provided through colonial polyclinics, the healing process was often not completed. Stopping treatment prematurely causes this disease to recur, forming an endemic cycle that is difficult to break without consistent medical intervention and a better understanding of health. This phenomenon shows that the public health issues in Kerinci are not only due to the lack of facilities but also to the way the community understands disease, the body, and the healing process—a cultural factor that further reinforces their epistemological isolation from the colonial medical world.

Malaria and goitre (enlargement of the thyroid gland) are two more ailments that appear frequently in colonial health reports, in addition to scabies. Both of these ailments were identified as the primary causes of visits to the polyclinic, despite the fact that the number of patients was still quite modest in comparison to Kerinci's entire population (*Geneeskundig Tijdschrift Voor Nederlandsch-Indie Deel XLIX*, 1909). The high malaria rate is related to the local ecology characterised by small swamps, areas around rice fields, and humidity at certain points in the valley—conditions that still allow for the development of disease vectors despite Kerinci being a

highland area. Meanwhile, struma indicates the presence of chronic iodine deficiency problems commonly found in mountainous areas far from seafood sources, a condition that further reinforces the picture of nutritional isolation in the community before the construction of highways expanded the supply network (Bataviaasch Nieuwsblad, 1913).

The presence of the colonial polyclinic indeed marks the arrival of the early form of modern medical intervention in Kerinci, but its effectiveness is very limited. The reach of the polyclinic was mostly felt by a small portion of the population living around the administrative center and having better mobility. For the majority of residents living in remote villages, geographical distance, the condition of footpaths, time constraints, and cultural barriers drastically reduce access to healthcare services. Thus, although colonial reports noted a lack of major diseases, the reality of public health in Kerinci is far more complex and fraught with endemic challenges accumulated from isolation, low medical education, and inadequate health infrastructure (Haan, 1909).

The pattern of scabies treatment among the Kerinci community in the early 20th century essentially reflects a broader tendency in the local public health behaviour. As explained earlier, the dominance of traditional medical practices, the low ability to read disease symptoms, and the limited access to colonial medical personnel formed a health knowledge ecology that was very different from modern medical standards. In this framework, the community's response to disease is largely determined by two main factors: the limited understanding of modern medicine and the social construction of the disease itself. The phenomenon of scabies is the clearest example of how social perception can determine health behaviour patterns: itchy, sore, and infected skin conditions are no longer viewed as serious medical threats, but have become part of daily life that is considered normal and therefore does not require a doctor's intervention. This permissive attitude continues even as symptoms worsen, while the treatment process, if pursued, often stops before completion. A similar pattern is also evident in the handling of other diseases such as malaria and goitre, which, although they began to be recorded in the data of colonial polyclinic visits, still show low levels of awareness and structural limitations in accessing healthcare services (Bataviaasch Nieuwsblad, 1913).

Moreover, the tendency of the Kerinci community to handle diseases through methods considered ordinary and not requiring a doctor's assistance is also closely related to the strong persistence of traditional medicine practices as the primary reference in daily life. As seen in the treatment of scabies, malaria, and struma, the primary choice of the community was not the colonial polyclinic, but rather local herbal remedies and medical practices that had been passed down through generations. Although the colonial health archives of 1909 did not detail the types of concoctions, treatment techniques, or rituals used—a common gap in colonial medical reports—it is highly likely that the use of medicinal plants, traditional oils, and healing methods based on empirical experience remained dominant. These practices align with the general pattern in the interior regions of Sumatra at that time, where local medical knowledge functioned as a relatively

autonomous healthcare system and did not rely on colonial authorities (*Geneeskundig Tijdschrift Voor Nederlandsch-Indie Deel XLIX*, 1909)

The limited penetration of colonial medicine in Kerinci was also reinforced by the significant social distance between the villagers and the government health workers. Polyclinics or district doctors, although administratively present in the region, remained far removed from the daily lives of the community, both geographically and culturally. The lack of direct communication, language differences, and unfamiliarity with modern medical methods create psychological and social barriers that hinder the formation of trust in colonial doctors. As a result, although health reports recorded patient visits, some were not followed through to completion, and many patients delayed or completely refrained from seeking treatment. This situation shows that modern health interventions have not been able to penetrate the strong local medical system that has been deeply rooted in the lives of the Kerinci community (Haan, 1903).

The lack of trust in colonial medical personnel and the dominance of traditional medical practices cannot be separated from the very limited infrastructure conditions at that time. The network of roads connecting Kerinci with the western coastal areas of Sumatra in 1909 was essentially just a series of narrow, steep footpaths, often traversing rocky slopes and steep ravines. In such conditions, interactions between the indigenous communities and the colonial administrative center became very rare and irregular, making it difficult for colonial medical influence to reach the daily lives of the residents. This condition reinforced the community's dependence on deeply rooted local medical practices, as illustrated in the treatment patterns for scabies, malaria, and goitre, which were more often addressed with traditional remedies rather than clinical care (Haan, 1909).

Geographic Isolation of Kerinci and Mobility Limitations

The limitations of the infrastructure also have a direct impact on the distribution of medical logistics. Medicines, medical equipment, and doctors must be transported along footpaths that can only be traversed on foot or using pack animals, resulting in very slow distribution and high costs. In many cases, medicines arrive late, the stock of medical equipment is inadequate, and medical personnel have to work with facilities far below the standards of colonial healthcare services in coastal or urban areas. The level of accessibility of healthcare services is further pressured by the reality that many villages are far from administrative centers, causing the community to prefer local treatments available in their immediate surroundings rather than undertaking a long journey to the colonial polyclinic (Haan, 1903).

Furthermore, geographical isolation also significantly impacted the colonial government's ability to respond quickly to potential epidemics. In a situation where mobility is severely limited, early identification of infectious diseases becomes difficult, while preventive measures and medical interventions are often delayed. As a result, public health in Kerinci at that time was entirely shaped by a combination of limited physical access, low trust in colonial medical personnel, and the

sustainability of traditional medicine systems that had adapted to harsh geographical conditions (Haan, 1903).

Although infrastructure limitations have restricted the distribution of medical services and diminished the reach of colonial health interventions, these isolation conditions have also created a paradoxical effect that is important to understand. As has been seen in previous discussions, the difficulty of accessing medical personnel and medicines made the Kerinci community highly dependent on traditional healing practices. However, at the same time, the lack of connectivity with the outside world actually provided natural protection against several infectious diseases that were a major threat in port cities and colonial administrative centers at that time. Diseases such as cholera, smallpox, and typhus, which were widespread in coastal areas and major trade routes in 1909, were not recorded in Kerinci. This is not due to the success of colonial health policies, but rather a geographical consequence of the region's remoteness (*Geneeskundig Tijdschrift Voor Nederlandsch-Indie Deel XLIX*, 1909).

In the absence of significant numbers of people and products, the likelihood of new infections entering Kerinci is relatively low. The difficult-to-navigate trails inhibit inter-regional mobility, preventing diseases that normally spread swiftly through human movement and modern transportation networks from entering this distant location. However, this protective effect is only applicable to diseases that rely extensively on cross-regional migration. The Kerinci community's isolation did not make them healthier in general; instead, they remained prone to chronic diseases, skin infections, and health conditions that were not adequately handled due to limited access to medical care (*Geneeskundig Tijdschrift Voor Nederlandsch-Indie Deel XLIX*, 1909).

This ambiguous position becomes more apparent when looking at the demographic and ecological aspects of the Kerinci region, notably Sendaran Agung, which was one of the main settlement centers at the time. After noticing how isolation gives both protection and susceptibility in terms of health, demographic data demonstrates how precarious that balance is. Sendaran Agung is home to 65,232 Kerinci people (Korintjjeers), with only 104 Malays and 11 Chinese as immigrants. The virtually uniform population makeup implies that traditional institutions and local networks continue to dominate the community's social life, playing an important role in defining the community's attitudes, behaviors, and disease-fighting strategies (*Geneeskundig Tijdschrift Voor Nederlandsch-Indie Deel XLIX*, 1909).

The ecological characteristics of Sendaran Agung clarify the health dynamics that were previously unclear. As a highland region with an average temperature of around 22°C and an annual rainfall of approximately 2000 mm, this area has a fertile and humid ecology, an ideal condition for agriculture, which is the mainstay of the Kerinci community's economy. However, such an environment also becomes a habitat that supports the development of various disease vectors, especially mosquitoes that carry malaria, one of the diseases that has been mentioned as a major health issue in colonial medical reports. On the other hand, the abundance of water also has

the potential to increase the risk of waterborne and hygiene-related diseases, especially in communities that do not yet have access to modern sanitation (Zentgraaf, 1936).

The integration of humid ecological conditions, dense demographic structure, and the previously described geographical isolation has resulted in a complex health space. Although the lack of connectivity protects the community from major outbreaks like cholera and smallpox, the local environment actually provides ideal conditions for endemic diseases that spread slowly but persist for a long time. When medical access is limited, and when modern health knowledge has not been effectively distributed due to trust and infrastructure barriers, these ecological and demographic factors become the main determinants of public health conditions (ANRI, 1933).

Colonial health reports continued to categorise the health condition of the Kerinci community as satisfactory. This assessment seems superficially aligned with the absence of major diseases such as cholera or smallpox. Nevertheless, this term "satisfactory" must be understood critically. In the framework of colonial evaluation, health standards were often measured solely by the absence of major epidemics threatening administrative stability, rather than from the perspective of comprehensive community well-being. Factors such as the high incidence of scabies, malaria, psychological stress due to earthquakes, and unequal access to medical care do not receive adequate attention in official reports (*Geneeskundig Tijdschrift Voor Nederlandsch-Indie Deel XLIX*, 1909).

The humid geographical conditions, high rainfall, and psychological pressure from the series of earthquakes increasingly highlighted the complexity of the public health landscape in Kerinci in the early 20th century. After it was previously explained that repeated earthquakes not only destroyed residents' homes but also caused prolonged stress that affected immunity, the 1910 health report showed how this vulnerability manifested in the form of endemic diseases that continued to dominate the daily lives of the community, especially in densely populated areas like Sendaran Agung. In an environment that has been ecologically identified as fertile yet prone to the development of disease-carrying organisms, three types of diseases stand out as the main threats: malaria, scabies, and various catarrhal infections of the respiratory and digestive systems (*Geneeskundig Tijdschrift Voor Nederlandsch-Indie Deel XLIX*, 1909).

Malaria is the disease that imposes the greatest impact on the population. Although Kerinci is located in the highlands, its ecological circumstances, particularly high humidity, annual rainfall of thousands of millimetres, and abundance of rice fields and puddles, make it an ideal environment for the development of *Anopheles* mosquitoes. Because of the lack of modern drainage systems, rainwater is frequently trapped for extended periods of time, while agricultural activities based on wet rice fields make these locations breeding grounds for difficult-to-control mosquitos. The community's immune system weakens as a result of seismic stress and unstable living conditions, allowing malaria to spread quickly and become a disease that is nearly always present in daily life (ANRI, 1933).

Aside from ecological reasons, social and cultural factors contribute to the spread of malaria. Low health literacy and a lack of public awareness of preventive measures such as wearing protective clothing, drying stagnant water, and segregating sleeping areas have rendered prevention efforts nearly worthless. As previously discussed, reliance on traditional medicine and distrust in colonial medical staff hinder the usefulness of contemporary medical interventions. Malaria treatment was intermittent and unequal due to the lack of permanent healthcare facilities, with incidental visits from colonial medical personnel hampered by steep and treacherous routes (H.C. Zentgraaf et al, 1936).

In addition to malaria, which spreads with increased labor mobility and the convergence of people from other camps, scabies is one of the most common and pervasive diseases among Sendaran Agung residents. If malaria is considered as a significant life-threatening disease that is frequently related with working conditions in the forest and stagnant water near road building sites, scabies provides a distinct image of how diseases can spread through more subtle but equally persistent social mechanisms. Scabies spreads mostly through direct physical contact, sharing bedding, infrequently washed clothing, and poor village sanitation—all of which are aggravated by the existence of dense and temporary work camps near the road project (Haan, 1909).

Unlike malaria, which was treated by the Dutch colonial government as a health threat requiring structural interventions—ranging from drainage, kerosene spraying, to work area quarantines, which involved restricting and isolating infected workers in specific locations to prevent transmission and ensure smooth operations. Scabies was actually considered a mild disease, both by the Dutch colonial authorities and the local population. Although its symptoms include chronic itching, open sores, and secondary infections that can disrupt work productivity, this disease is often overlooked because it does not cause immediate death. Even when this disease affects traditional leaders, village heads, or local elites, it is still regarded as something "ordinary," a part of the daily life of rural communities. In many cases, the treatment provided by the health officer stops before full recovery is achieved, because the patients feel the itch has decreased and do not see the urgency to continue the treatment.

This condition caused scabies to be not only biologically endemic but also socially endemic: a disease that continues to recur, is allowed to persist, and becomes part of the health landscape of Kerinci during the colonial road construction period. Thus, if malaria illustrates the relationship between infrastructure and the ecological environment of disease, then scabies shows how human density, changes in social interaction patterns, and sanitation disparities arising from the highway project create space for this skin disease to persist and spread. Both diseases, despite their different characteristics, similarly demonstrate that the construction of Korintjiweg transforms not only geographical space but also the public health space surrounding it (Haan, 1903).

Aside from scabies and malaria, catarrhal disorders, including infections of the upper respiratory system and digestive tract, are regularly recorded in the Sendaran Agung region, adding

to the overall picture of the disease load plaguing Kerinci's rural communities. If malaria demonstrates how changing work environments can cause outbreaks of vector-borne diseases, and scabies reflects transmission through housing density and daily social interactions, catarrhal demonstrates another dimension of health vulnerability: the impact of a combination of housing conditions, consumption patterns, and domestic sanitation deficiencies. Sharp temperature variations, which are common in highland locations, as well as the habit of living in dwellings without appropriate ventilation, where kitchen smoke, humidity, and poor air circulation provide an ideal habitat for respiratory infections, are common causes of this condition (Haan, 1909).

In many rural houses in Kerinci at that time, there was little or even no ventilation at all, because the traditional stilt house structure was more designed to protect against wild animals and extreme weather than to maintain indoor air quality. This condition was exacerbated by patterns of food and drink consumption that were not always hygienic, either due to a lack of clean water supply or because knowledge about food hygiene was not widespread. Catarrhal is indeed rarely fatal, but its tendency to recur easily and often become chronic makes it a disease that gradually but surely lowers the body's resistance. As a result, residents who are already vulnerable to malaria or scabies become weaker and more susceptible to other diseases. In the context of crowded labour camps and the gathering of people from various villages during highway construction, this disease even becomes one of the easiest to spread due to its perceived non-dangerous nature (*Geneeskundig Tijdschrift Voor Nederlandsch-Indie Deel XLIX*, 1909).

Highway and Transformation of Nutrition Access

Before the construction of the highway, Kerinci was known as a region with a very large surplus of rice. The Mededeelingen van den Burgelijken Geneeskundigen Dienst report noted that the people of Kerinci had rice reserves estimated at two million pikol, a figure that reflects the closed nature of the local food system due to the region's isolation. The steep and difficult mountain footpaths do not allow for significant rice trade out of Kerinci, causing rice to continue to accumulate in household and village granaries. This condition creates an interesting health paradox: on one hand, the community lives in food abundance, but on the other hand, the quality of nutrition stagnates, especially because the rice consumed rarely undergoes circulation, refreshment, or diversification through trade with outside regions (Mededeelingen van het bureau, 1914).

The sole dependence on rice, especially finely milled rice that is low in vitamin B1 (thiamine), makes beriberi a latent threat that is difficult to recognise by both the local community and colonial medical personnel. In a state of the body that has been weakened by chronic diseases such as catarrhal or scabies, thiamine deficiency worsens the condition, causing fatigue, swelling, respiratory disturbances, and even death in severe cases. Thus, the issue of beriberi cannot be understood separately from the context of other endemic diseases: it is part of a circle of

vulnerability shaped by the environment, sanitation, medical knowledge, and economic isolation (Meijer, 1864).

In this context, the Dutch colonial government began to view the issue of beriberi not merely as a public health problem, but as a "technical nutrition problem" related to the quality and characteristics of the rice consumed by the people of Kerinci. This assessment was heavily influenced by the medical paradigm of the early 20th century, when beriberi was still often understood as a disease arising from the deficiency of certain elements in rice that had undergone excessive milling or prolonged storage. The surplus of Kerinci rice, reaching millions of pikul, was stored for years in the barns of residents' homes and was viewed by colonial doctors as a major potential for developing nutritional deficiencies, especially because the rice underwent drying, smoking, and prolonged storage processes that were believed to deplete essential nutrients like vitamin B1 (thiamine). In this perspective, the quality of Kerinci rice is not just about the quantity of food, but also involves the medical risks associated with a monotonous and undiversified consumption pattern (De Avondpost, 1923).

This technical perspective became increasingly prominent when the construction of highways began to open up the Kerinci region in the 1910s to 1920s. The Dutch colonial government observed that prolonged isolation had created a stagnant food pattern, so when the flow of mobility increased—whether through forced labour, wage labour, or soldiers passing along the construction routes—the risk of beriberi spread significantly. In health reports, beriberi was then mapped not merely as a "local" disease, but as a structural phenomenon related to economic transformation and labour mobilisation. Such an understanding prompted the Dutch colonial government to adopt a technical approach, namely improving the quality of rice, supervising the milling process, and proposing food diversification for workers and villagers. These technical policies, although appearing scientific and neutral, actually stem from a colonial perspective that views the bodies of the local population as objects of intervention in order to maintain labour productivity during the infrastructure development process (Wahyu Suri Yani, 2020).

However, this situation changed drastically when the vehicle road (autoweg) was opened, connecting Kerinci with the western coast and Padang. This transformation of infrastructure not only eliminated the region's isolation but also shifted the foundation of the food economy, which had previously relied on a long-term storage system. In the framework of colonial health technical thinking, this change immediately raises new concerns: when rice that has been stored for decades, even up to a hundred years, begins to move out of the granaries of residents' homes, what is its nutritional quality after undergoing the processes of smoking, drying, and long-term storage without circulation? This question reveals that road construction not only opens physical access but also unveils the "biological archives" of the consumption patterns of a society that have remained untouched by structural changes for centuries (Haagsche Courant, 1926).

The transition from a static storage system to an open distribution system fundamentally changes the food logic of Kerinci. If previously the abundance of rice was understood as a symbol of prosperity and food security, then after the road construction, that abundance is re-evaluated as a potential health risk associated with the decline in nutritional quality. This situation became increasingly apparent when the flow of goods and people began to rise, especially with the mobilisation of workers for the road construction project. Cases of beriberi that were previously hidden behind stockpiles of food reserves are starting to surface, not because the disease is newly emerging, but because human movement is revealing nutritional vulnerabilities that have long been under the radar, obscured by geographical isolation and minimal colonial medical observation (Haagsche Courant, 1926).

The question regarding the nutritional value of old rice finally received a scientific explanation when the Dutch colonial government assigned Dr. B. C. P. Jansen, head of the chemistry department at the Health Laboratory in Weltevreden, to investigate it. This research was not merely a laboratory experiment, but a direct response to the significant changes that occurred after the highway was opened and the Kerinci rice reserves began to emerge from their isolation. The colonial concern that *honderdjarige rijst*—old rice said to be up to a hundred years old—might lose its nutritional quality prompted Jansen to conduct a series of systematic tests on the vitamin, protein, and digestibility content of the rice. Through rigorous experiments using birds and laboratory rats, Jansen found that the vitamins present in the bran of rice, particularly vitamin B1 (thiamine), which plays a crucial role in preventing beriberi, did not undergo significant degradation even though the rice had been stored for several decades (Haagsche Courant, 1926).

These results show that the experimental animals given old rice did not exhibit symptoms of beriberi different from those given new rice, a finding that revises the initial assumption that the age of the rice was the main cause of the high incidence of beriberi in Kerinci. From the perspective of colonial health, this finding is very important because it shifts the focus of analysis from merely "aged rice" to more structural issues, namely how the people of Kerinci treat, process, and consume their rice. In other words, the issue of nutrition does not lie in the quantity and age of the abundant rice, but in how the rice is processed and cooked in daily life (Algemeen Handelsblad, 1923).

Jansen's findings also open up space to view the relationship between social changes due to road construction and the emergence of beriberi from a broader perspective. With the opening of the transportation network, the rice milling process began to change: rice was more often milled until it was very white, removing the bran layer which was actually the main source of thiamine. Moreover, the new mobility has caused changes in the eating patterns of road workers and the community, who are now more connected to the commercial market, leading to food consumption that is increasingly orientated towards convenience and speed, rather than nutritional content. Therefore, Jansen's research emphasises that beriberi in Kerinci is a complex phenomenon influenced by economic transformation, changes in consumption habits, and the indirect impact

of road infrastructure—not just the issue of rice stored in home granaries for decades (De Avondpost, 1923).

Furthermore, Dr. Jansen's research does not stop at the analysis of vitamin content alone. He also examined the quality of protein as well as the presence of important enzymes such as protease, lipase, and amylase that play a role in the digestive process. The results of the chemical tests showed that these enzymes remained stable even though the rice had been stored for decades, indicating that the natural biochemical processes of the aged rice had not undergone significant damage. To strengthen the empirical evidence, Jansen conducted digestion tests not only on birds and experimental rats but also through direct consumption by one of the research colleagues voluntarily. This test shows that the digestibility of old rice is as good as that of new rice, further reinforcing the conclusion that the *honderdjarige rijst* from Kerinci remains safe for consumption and highly nutritious (De Avondpost, 1923).

This finding serves as a very important scientific affirmation in re-evaluating the colonial assumption that beriberi in Kerinci was caused by the declining quality of rice due to extreme storage duration. With strong laboratory evidence, it is clear that the aetiology of beriberi is more related to how rice is processed and consumed after Kerinci entered a new era of mobility following the opening of the highway, rather than the rice being stored for too long. This directly connects with the previous discussion on economic transformation and changes in consumption patterns: as the highway began to connect Kerinci with the western coast and Padang, the shift from brown rice to finely milled white rice became increasingly common, resulting in the loss of essential vitamins like thiamine during the modern milling process (De Avondpost, 1923).

Jansen's research findings have strategic significance that transcends purely medical boundaries. With the new connectivity formed through the construction of the *autoweg*, Kerinci is no longer a food granary trapped by geographical isolation, but rather transforms into a logistics hub capable of channelling high-nutrient rice reserves to broader regions, including areas on the west coast of Sumatra that often experience food shortages. The highway serves a dual purpose: on one hand, it accelerates economic mobility, and on the other hand, it becomes a food distribution route that contributes to regional nutritional resilience (Haan, 1903).

However, the nutritional and economic benefits brought by road construction do not come without consequences. If in the previous paragraph the new connectivity allows Kerinci to channel nutritious food reserves to the western coastal areas and regions prone to shortages, at the same time, the highway also opens up another flow that is more difficult to control: the movement of people and pathogens. The road infrastructure that breaks the geographical isolation of Kerinci not only strengthens the region's position as a logistics hub and a supplier of high-value rice but also introduces new health challenges that were previously not part of the daily life of the highland community. Connectivity with the outside world increases the likelihood of the entry of diseases that are rare or have never appeared in the agro-ecological environment of Kerinci, such as types

of malaria from coastal swamp areas, skin infections common in humid coastal regions, and gastrointestinal disorders brought by contract workers from outside the area (Haan, 1909).

Intensive mobility during the road construction process also increases the risk of spreading infectious diseases. The influx of forced labourers, contract workers, traders, and passersby creates new spaces of interaction—from temporary work camps to logistics posts along the road route—that become hotspots for disease transmission. In several colonial health reports, the opening and construction of highways were often accompanied by spikes in cases of malaria, dysentery, skin infections, and diseases that developed due to poor sanitation and overcrowding in worker barracks. Thus, roads that on one hand expand access to food, nutrition distribution, and economic opportunities, on the other hand also open the door to the circulation of pathogens between regions. These two processes run simultaneously and are interconnected, showing that colonial infrastructure had a far more complex impact: it connected economic spaces while also bringing together populations and diseases that were previously separated (Haan, 1903).

Interestingly, before the highway was opened, the health condition of the Kerinci community was relatively protected from various infectious diseases common in coastal areas. The 1910 health report showed no cases of beriberi, cholera, syphilis, or severe eye diseases in this area. The condition was in stark contrast to the western coast of Sumatra, which in the same decade was frequently struck by cholera and smallpox outbreaks. The absence of these diseases is not unrelated to the geographical isolation of Kerinci: before the construction of roads, access to this region was only through mountain footpaths that limited the mobility of people and goods from outside. Thus, Kerinci was relatively sterile from diseases that were usually spread through ports and major trade routes. However, this situation changed drastically after the construction of roads increased connectivity and opened up space for the movement of people, food, and pathogens (*Geneeskundig Tijdschrift Voor Nederlandsch-Indie Deel XLIX*, 1909).

In addition to leprosy cases, health reports also recorded several cases of gonorrhoea that were successfully handled by medical personnel. The emergence of this sexually transmitted disease indicates certain social dynamics within the Kerinci community, possibly related to limited migration, the influx of workers from outside the region, or inter-group trade interactions. Although referred to as *beperkte gevallen* (limited cases), the presence of gonorrhoea confirms that Kerinci is not entirely free from sexually transmitted diseases that are widespread in other colonial regions. In the context of regional openness due to road construction, these cases become an early indication of a more complex transformation in public health (*Geneeskundig Tijdschrift Voor Nederlandsch-Indie Deel XLIX*, 1909).

This situation became increasingly evident when the 1910 health report mentioned the lack of civilian hospitals in the Sendaran Agung district. The lack of permanent medical facilities suggests that, while some infectious diseases have been identified, institutional response to health issues remains severely constrained. The Dutch colonial government's lack of attention to the

development of healthcare facilities in remote locations such as Kerinci demonstrates a disregard for public health, particularly in districts that are not yet considered economically or politically strategic. In the context of regional openness as a result of road building, the lack of health infrastructure raises the danger of disease consequences entering through increased mobility (*Geneeskundig Tijdschrift Voor Nederlandsch-Indie Deel XLIX*, 1909).

With the absence of civilian hospitals and minimal colonial attention to health infrastructure, local medical treatment practically relied on mobile clinics or incidental visits from medical personnel from colonial centers on the west coast. As a result, the community—especially those living far from district centers like Sungai Penuh—faces significant difficulties in accessing professional services, thus relying on traditional medicine, village shamans, and ancestral recipes. The absence of hospitals also means the lack of systematic medical records, diagnostic facilities, or isolation rooms for infectious disease patients. Diseases that could actually be addressed early often develop into chronic conditions or cause long-term disabilities. The gap in health infrastructure between colonial centers and the hinterlands reflects the colonial power structure that did not prioritise the welfare of the local population except in relation to economic productivity or security stability (*Geneeskundig Tijdschrift Voor Nederlandsch-Indie Deel XLIX*, 1909).

IV. CONCLUSION

The health conditions of the Kerinci community during the period 1903–1915 provide a clear picture of how geographical isolation, limited mobility, and the mountainous environment created a health landscape that was very distinctive and different from the coastal areas or colonial port cities in Sumatra. Before the construction of the Kerinci Highway (Korintjiweg), this region was practically cut off from the modern land transportation network; the connection with the west coast relied solely on dangerous, slippery footpaths that took days to traverse. The condition of isolation made the flow of medicines, healthcare workers, medical information, and everyday consumer goods very slow. In such a situation, the community's ability to respond to diseases is severely limited by local knowledge, an agrarian lifestyle, and almost no access to colonial healthcare facilities.

Long-term isolation has formed a relatively stable disease pattern but is vulnerable to environmental fluctuations. Endemic diseases such as beriberi, digestive disorders, skin diseases, tropical fever, and parasitic infections became part of the daily life of the people of Kerinci. Early colonial sources after 1903 noted that the community often experienced health complaints closely related to ecological conditions, especially dietary patterns relying on local rice, rice paddy farming activities requiring intensive physical labour, and high exposure to wet environments and forests. This situation was exacerbated by the absence of formal healthcare facilities; government doctors only arrived after the colonial administration was established, while traditional healing often became the only option.

Nevertheless, isolation also provided some natural protection. The minimal inter-regional mobility meant that Kerinci did not frequently experience large-scale epidemics like cholera or plague—diseases that, by the end of the 19th century, heavily affected ports on the west coast of Sumatra. In other words, isolation creates a paradox: it gives rise to structural vulnerability to endemic diseases related to poverty and the environment, but also prevents the entry of new diseases brought in through regional trade flows. However, this protection is not permanent. Once the Dutch took control of Kerinci in 1903 and began opening up access to administration, mobility, and communication, changes in disease patterns started to become apparent. Colonial reports in the early 20th century indicated the emergence of previously rare disease cases, coinciding with increased interaction between Kerinci and the coastal areas.

Taking these elements into account, research on public health in Kerinci prior to Korintjiweg's arrival demonstrates that colonial health is not just understood through medical regulations or the presence of healthcare facilities, but also through features of space and movement. The succeeding highway, established in 1917, served as both a transportation infrastructure and an access point for epidemiological changes that connected Kerinci to the outside world. Thus, this research emphasises that to understand the history of health in the interior of Sumatra, it is necessary to view it not only as a medical issue but as part of the complex interactions between the environment, colonial structures, and the dynamics of local community life—dimensions that have so far received little attention in the study of the health history of the Dutch East Indies.

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